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Intellectual Property and the Academic Enterprise

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Scholars who have chosen an academic career have traditionally considered openness of information to be a key, immutable value. This firmly held belief is particularly characteristic of academic research scholars in science and technology. Their ethic is that research results should be published, the sooner the better, and available to all. And they in turn should have prompt, unfettered access to the research results and even the underlying data arising from other scholars' work. That ethic is the essence of the 20th century academic enterprise.

In the last several decades academic institutions have been led by a combination of legislation and financial incentives—some would say "greed" and others would say "financial necessity"—to pursue measures arguably in tension with that ethic. Academic institutions have sought exclusivity, through intellectual property and particularly patents, with respect to certain applications of such research information. A modern American research university has become, to that extent, an academic enterprise in the economic sense. The fact that patenting does not preclude publication, nor greatly delay it, has obscured the tensions inherent between these two senses of the high-minded academic enterprise concept.

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[*] Max Pam Professor of American and Foreign Law, University of Chicago. This paper was prepared as the keynote address at a conference on The Changing Use and Character of Intellectual Property held at the National Academy of Sciences in Washington, D.C. on December 3-4, 1998, and sponsored by the German-American Academic Council Foundation. Despite the generality of its title, the conference was primarily devoted to the impact of expanded intellectual property rights, and especially biomedical patents and proposed database protection, on scientific research, especially in universities. Since most of the participants in the conference and certainly the bulk of the audience were neither lawyers nor economists, but rather producers, consumers and funders of scientific research, I have concentrated more on policy issues than on legal or economic doctrine. I should like to thank Douglas Lichtman and the participants in the conference for their helpful comments. And for generous support of the research for this paper I thank The Sarah Scaife Foundation Fund and The Lynde and Harry Bradley Foundation Fund.

Under the 1980 Bayh-Dole Act universities were authorized and in practice required to seek patents on innovations arising out of research carried on with federal funding.[1] Not only did patenting become expected, but research universities set up offices to license patents and increasingly to exploit patents through the venture capital route. Few universities have found that the resulting licensing and equity revenues have become decisive in their research and teaching budgets. American universities expended nearly $20 billion on sponsored research in 1997, yet received less than $500 million of gross licensing revenues, before such patenting and licensing expenses as nearly $100 million in legal fees.[2] However, some of the early successes, such as the Cohen-Boyer patents, captured the imagination of universities and scientists across the continent. Small wonder because by 1995 the Cohen-Boyer patents had returned $139 million to Stanford, the University of California at San Francisco and the two inventors![3] It is fair to say that modern American research universities have become, at least in some areas of science and technology, economic enterprises as well as centers for teaching and research.

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[1] 35 U.S.C. §§200-211, 391-307.

[2] The Association of University Technology Managers publishes data annually. The FY 1997 data for the 132 universities having more than one half-time employee involved in technology transfer, reflected in the text, also show that the type of university, especially whether the university has engineering departments, makes a difference since applied research is in principle more likely to take place in such a school than in basic science departments. (However, the fact that biological science departments are major sources of patents is discussed later in the text.) MIT (third largest in sponsored research) had about five times more sponsored research than the University of Chicago, a university with no engineering departments ($713 to $151 million) but eleven times more gross licensing revenue ($21.2 to $1.8 million). Universities without large graduate programs did comparatively more poorly; Lehigh had $25 million in sponsored research but only $113,000 in gross licensing revenue. Some of the biggest payoffs come in start-up companies but the financial gain is not reported (though the start-ups are sometimes patent licensees); MIT reported 17 new start-ups, Chicago two, and Lehigh none. The rate of patenting is itself important insofar as it foreshadows future licensing revenue. MIT filed for 292 patents with 134 issued, Chicago applied for 44 with 23 issued, and Lehigh applied for 16 with 7 issued.

[3] National Research Council, Intellectual Property Rights and Research Tools in Molecular Biology 41 (1997).

The resulting public policy issues have become particularly pronounced in the biomedical sciences. In this fast-paced world it is increasingly difficult to differentiate at the margins between basic and applied research. Some would say that basic research in these fields has a more immediate economic payoff than had been true in most scientific fields in the past. Indeed, much of the enormously increased public funding of the past few decades in the biomedical sciences has been motivated by the hope of near-term improvements in human well-being through improvements in public health and the treatment of disease. Not only do these near-term payoffs necessarily bring near-term financial opportunities to universities and their faculties, but it is increasingly difficult to distinguish what major research universities in these fields do from what major biotech and pharmaceutical firms do. One can grasp the contemporary situation in these fields by visualizing the activities of research universities and money-making firms as a Venn diagram with the area of overlap steadily increasing.

One concern in the academic community about these developments arises from the fact that intellectual property plays a central role. And with the proliferation of new forms of intellectual property and particularly the steady strengthening of patent protection, the scientific research community has become concerned about the terms of access to research results and data and to research tools.

Patents are not the only form of intellectual property that create access problems and economic opportunities. Trade secret protection by private firms, particularly of processes, can limit access to some new technologies. Copyright protection can also be important, especially on the opportunity side, as demonstrated by the fact that the most important single innovation at the University of Chicago, in terms of financial return for the University, has been a secondary school mathematics textbook series based on new teaching methods. Copyright has thus far not proved to be a serious impediment to data access, not only because of the statutory “fair use” exception to infringement, but also because copyright has its primary economic function in protecting what is published and therefore available. However, the growth of “self-help” (or “copyright management”) systems to limit on-line copying and thereby help copyright holders capture the economic value of their works has raised a new set of issues, which came to a head in October when Congress outlawed the use of circumvention technologies with, however, broad exceptions for academic users.[4]

The issue of the protection of uncopyrightable databases by sui generis database legislation, a new type of intellectual property raising concerns about access to information, particularly scientific data, arose with the adoption of the European Union database directive in 1996, especially in view of the intention of the U.S. Administration to seek similar legislation, motivated at least in part by a reciprocity provision in the EU directive. A storm of criticism, especially in American academic circles, has delayed and perhaps permanently derailed the adoption of an international treaty and of U.S. statutory protection.

I.

Before outlining in more detail these issues, I should like to present a simplified, albeit in application not so simple, framework for discussing all intellectual property issues. In doing so, I shall show how this framework allows us to conceptualize why it may be appropriate to provide immunity against infringement liability for certain academic uses of the protected information.

The first analytical principle is that all intellectual property involves protecting *information*. Whether we are talking about databases or inventions or writings, it is helpful to think of what is being protected as information. Sometimes the information element is obscured by the form of protection. A product patent gives the patentee the power to exclude others from making, using and selling the product. But if it were not for the legal protection accorded, the fact that the innovation in question is information would be readily apparent. But for the patent statute, the innovator could protect his innovation only by keeping it secret. The centrality of information is readily apparent in some of the newer controversies concerning the alleged proliferation of arguably overly strong intellectual property rights, such as the question of patenting nucleic acid sequences and protecting databases. Indeed, with digitization, whatever the

[4] Digital Millennium Copyright Act, 1998, discussed below.

practical uses to which the new information is to be put, it is information (data, if you will) that is protected. And it is information in the form of research results and data that may be denied to the academic enterprise.

Information has some important economic characteristics. Information is a public good. By that economists mean that my use of information does not exclude or place any costs on your use of the same information. The reason that the public goods character of innovation information is important is that information is normally costly to create, yet cheap to copy. The innovator therefore cannot appropriate for himself the benefits of his innovation. In order to provide an incentive to innovate, society accords a right to exclude others. In the case of patent, the patentee can exclude others from making, using, or selling the product or process. Copyright protects only against copying, and therefore independent innovation is a defense against an infringement charge.[5] The controversy over the protection of databases involves information that lacks sufficient originality to be accorded copyright protection but is nonetheless valuable information that is costly to assemble in useful form.

In each of these cases—patent, copyright, and database protection—there is little controversy over the fact that without some protection, less innovation would occur. The *incentive to innovate* is therefore the second analytical principle. Incentive is especially important for the kind of innovation that requires large expenditures of funds and diligent, sustained application of human energy and intelligence. And in some fields, such as pharmaceuticals where statutorily required clinical trials are often far more costly than the innovation itself, society would benefit from far fewer new products if patents did not protect not just the innovation itself but the development and testing activities necessary for society to receive direct benefit.

Just as important as the incentive principle is access to the innovation. *Access* is thus the third, and for universities, perhaps the

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[5] Although the U.S. copyright statute speaks of writings and authors, copyright protection originally protected innovative charts, maps and the like and today protection has been extended to certain aspects of computer software code. Kenneth W. Dam, Some Economic Considerations in the Intellectual Property Protection of Software, 24 J. Legal Studies 321, 323-324 (1995).

key principle from the standpoint of academic research. There are many kinds of access issues, particularly in patent law, but the essence of the access principle is that we want not only to encourage the original innovator but we want also to encourage those who come later to build on and add value to the original innovation, and for that they must have access to that innovation. It is not enough for them, alluding to the most famous epigram in intellectual property, to stand on the shoulders of giants, they must be able to see what the giants saw and did. Thus, in intellectual property, innovation is not seen as a one-time thing; what counts is continued innovation over time.

This is all the more true when the original innovation was the product of basic research. The reason why public funding of basic research is justified, even in the eyes of the most market-oriented economist, is that the benefits of the research supposedly cannot be readily appropriated by the researcher. Yet if intellectual property ties up the results of that innovation so that they cannot be utilized by those who come later, then the very principle on which public funding is justified is undermined. So it is straightforward to argue that the results of publicly funded basic research should be made openly available to all.

The problem we are dealing with in connection with biotechnology arises because it is hard to say what is basic and what is applied research in view of the speedy transmutation of basic research results into products and processes of immediate direct value to mankind. And if the information derived from privately financed research is to be protected, then there is little basis in law or justice to deny patent protection to innovations resulting from publicly financed research. Indeed, it was precisely the legislative judgment behind Bayh-Dole that government agencies were failing to patent innovations they financed and, when they did obtain patents, they vitiated the usefulness of the patents by licensing them nonexclusively to private firms, thereby giving none of the private firms the necessary exclusivity to have an incentive to expend the necessary funds for further development and for bringing the innovation to market.[6]

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[6] For an analysis of the arguments used to support passage of Bayh-Dole, see Rebecca S. Eisenberg, Public Research and Private Development: Patents and

Patent law does provide for providing access to second-comers by requiring what is called "disclosure." No patent is valid that does not only describe the invention in "clear, precise, and exact terms" but also disclose sufficient information to enable second-comers to practice the invention without "undue experimentation." And, in a unique provision of American law, the patent applicant is required to disclose the best mode he contemplates to carry out his invention. But these two forms of disclosure, though formally enough information to practice the invention, often turns out to be insufficient in fact (given that patentees have an incentive to provide the least possible information). As a result, most patent licenses also provide for the transfer of the underlying know-how. In any event, the statutorily-demanded disclosure is rarely sufficient for the academic researcher, and for two reasons: First, it normally does not include the underlying data generated in the research leading to the invention and, second, it is usually far out-of-date when finally published. In American law publication does not occur until the patent issues, which is some two to three or even more years after the filing of the patent application, which itself may not occur until up to one year after the invention and occasionally longer.

By far the biggest weakness in the disclosure requirement, at least from the standpoint of academic researchers, is that the required disclosure may contain little scientific or technical data and therefore be of only general interest. Moreover, the invention may not be directly useable by the research community until the patent expires. That is because a patent not only excludes others from selling the invention but also from making and using it. American law has long recognized, though much less precisely than other legal systems because of our reliance on case law for this point, that non-commercial researchers should be able to make and use the invention for the purpose of research and further innovation. And so we supposedly give the researcher an "experimental use" defense to any infringement action.[7] Unfortunately, it is precisely in fields like the biomedical sciences, where even publicly-financed basic research may

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Technology Transfer in Federally Financed Research, 82 Virginia L. Rev. 1663 (1996).

[7] See generally Rebecca S. Eisenberg, Patents and the Progress of Science: Exclusive Rights and Experimental Use, 56 U. Chi. L. Rev. 1017 (1989).

have short-term economic payoffs, that the experimental use defense is least likely to be of benefit because the case law has tended to reject the defense whenever the researcher might actually profit. One possible improvement in American patent law would be to enact a statutory experimental use defense for the benefit of academic researchers, at least in the basic sciences. Such a provision was introduced but not enacted in 1990.[8]

II.

I have spent some time building up the principles of patent law even though the central patent-law controversy that led to this conference involves a rather narrow set of issues concerning the patenting of partial cDNA sequences—so-called Expressed Sequence Tags ("ESTs"). This EST controversy is important is its own terms. But in the fullness of time, and (in view of current research developments) in perhaps not very much time at all, we will have a complete map of the human genome, and this particular controversy is likely to fade into memory. But of course there are countless other genomes out there to map. Indeed, the issue for the future may be the patenting of entire genomes. And the emergence of a related controversy over the patenting of single nucleotide polymorphisms (SNPs) simply demonstrates that it is not possible to foresee in advance what problems will plague the patent system.[9] Since by definition the patent system is designed to protect products and processes arising in new technologies, patent law operates on the assumption that we cannot devise a new protection system for each new technology. This has not been true of copyright, where the Congress has enacted special copyright legislation for a long list of new technologies, and we do have several examples of sui generis forms of protection for new technologies. Moreover, we have seen special patent legislation for biotechnology in the 1995 amendment

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[8] See discussion of the circumstances of the 1990 bill in Eyal H. Barash, Experimental Uses, Patents, and Scientific Progress, 91 Northwestern U. L. Rev. 667, 695 (1997).

[9] A single nucleotide polymorphism "is simply a common alteration that occurs in a single nucleotide base in a stretch of DNA." Eliot Marshall, Snipping Away at Genome Patenting, 277 Science 1752 (Sept. 19, 1997).

concerning the non-obviousness requirement, and perhaps that is an omen of a new future for patent law.[10]

Still, I would argue that patent law has shown itself quite adaptable to new technologies. The requirements that an invention not only be new but also non-obvious and that a practical utility be demonstrated, together with the previously mentioned requirements that the patent application precisely describe the invention and that it show "enablement" and "best mode," provide sufficient flexibility for able judges to fashion sensible policy even for such startlingly new fields as biotechnology.

We should therefore distinguish more directly commercial from academic concerns about patenting in the area of biotechnology. The commercial concern has been that a biotech firm, say Human Genome Sciences, might obtain patents without having carried true innovation through to conclusion, thus depriving those best situated to come up with concrete products of direct and immediate benefit for mankind—say pharmaceutical companies—of a fair opportunity to obtain patent protection, except perhaps under license from EST patentees. And an opposing concern has been that if ESTs were not patentable, then perhaps later discoveries including the resulting protein might be considered, in view of now well-known tools and procedures, to be obvious and hence nonpatentable.[11]

Thus far the patent system has apparently not fallen prey to either of these dangers. And the Commissioner of Patents has gone a good way toward assuring the academic community that the patent system will not fail us in this respect.[12] Although I have not attempted a search of issued patents, I do note that Human Genome Sciences (the firm that was once at the center of the EST controversy) stated on its web site, in a December 1, 1998, update, that its patents "are designed to meet the traditional requirements of novelty, utility and enablement" and that they "describe the medical

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[10] 35 U.S.C. 102(b).

[11] The incentive and access aspects of the EST issue are explored in Kenneth W. Dam, Intellectual Property in an Age of Software and Biotechnology, University of Chicago Law and Economics Working Paper No. 35 (1995).

[12] See for example, letters from Bruce A. Lehman to Harold E. Varmus (Director, NIH), dated April 2, 1997, and to Bruce M. Alberts (President, National Academy of Sciences), dated July 1997, setting forth the requirements with regard to ESTs.

uses of more than 2,000 newly discovered individual human genes " as well as describe "full-length cDNAs that code for entire human proteins." If I interpret this language correctly (and of course there are various bases on which these HGS formulations may lead one astray), it would appear that despite earlier fears that partial sequences without known utility would be accorded patents, the Patent Office is in practice requiring "full-length" sequences coding for "entire human proteins." On the other hand, at least one recently issued patent can be considered an EST patent.[13] On balance, so far as I have determined, the fear of a flood of EST patents being issued is, at minimum, overdrawn.

Even if EST patents are not issued, a flood of biotech and genomic patents are now beginning to emerge, and an important question is what the consequences will be. Michael Heller and Rebecca Eisenberg have warned us against a forthcoming "tragedy of the anticommons."[14] Building on the well-known "tragedy of the commons" where people overuse shared resources,[15] Heller and Eisenberg hypothesize that people will underuse biomedical innovation because there will simply be too many patents out there in the hands of too many diverse firms. Certainly, they admit, companies with plans for new pharmaceuticals or other biomedical products can theoretically assemble the rights through license negotiations. But they warn that, in practice, "transactions costs" (an all-purpose law-and-economics term referring to actual costs, uncertainties and just plain miscalculation and irrationality of negotiating parties) will prevent many worthwhile products from appearing.

An "anticommons" is a serious possibility that we should worry about, but in my view it is less of a risk than that insufficient patent protection will be granted where it is most needed—that is, not just for the original research but also where large expenditures and big risks have to be incurred to develop biomedical products, to carry out the necessary clinical trials, and to launch those products

[13] U.S. Patent No. 5,817,479 (Oct. 6, 1998) on Human Kinase Homologs, issued to Au-Young et al. and assigned to Incyte Pharmaceuticals, Inc..

[14] Michael A. Heller and Rebecca S. Eisenberg, Can Patents Deter Innovation? The Anticommons in Biomedical Research, 280 Science 698 (May 1, 1998).

[15] Garrett Hardin, The Tragedy of the Commons, 162 Science 1243 (1968).

successfully. Several points have to be kept in mind. First, pharmaceutical and medical supply companies have long been accustomed to assembling rights. Second, joint venture licensing arrangements along the lines of those between Human Genome Sciences and Incyte, on the one hand, and an increasing number of pharmaceutical firms, on the other, may grow in pace with the proliferation of property rights.[16] While these licensing arrangements may not meet the needs of academic researchers, they do suggest that the proliferation of gene patents is unlikely to hold back the development of new pharmaceuticals of benefit to human beings. Indeed, and this is a third point, if it were not for well-defined, enforceable property rights in the form of patents, one could anticipate even greater uncertainty, miscalculation and other transactions costs.

The anticommons is not a new threat. A number of industries have turned to patent pools, at least when the Antitrust Division did not interfere, to solve similar problems.[17] In a classical patent pool, patents are licensed to a central agent. A similar, and I suspect much more widely used, technique is voluntary, industry-wide cross-licensing. Certainly the computer hardware industry, which faced an equally daunting problem of proliferating patent rights and where speed to market was at least as much a survival necessity as in biotechnology, long used patent cross-licensing with remarkable effectiveness. With cross-licensing of its computer hardware portfolio each firm could bring new products to market without worrying about patents held by their competitors. The cross-licenses were renewed periodically for a period of years so that they covered future-issued patents, and the incentive to innovate remained both because side-payments based on the strength of patent portfolios were made and because innovation still paid off in enabling firms to

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[16] For a description of these licensing arrangements, which differ considerably in detail between Human Genome Sciences and Incyte, see Roberta S. Eisenberg, Intellectual Property at the Public-Private Divide: The Case of Large-Scale cDNA Sequencing, 3 Univ. Chicago Law School Roundtable 557, (1996).

[17] Similar problems have been solved in the copyright industries through collective rights organizations. See for a treatment of the legal and economic policy issues in patent pools and collective rights organizations, Robert P. Merges, Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations, 84 Calif. L. Rev. 1293 (1996) (hereafter "Merges on Contracting").

be first to market, not just among the cross-licensing firms but also to fend off the incursions of new firms.[18]

The policy issue is whether it is better to restrict patent rights in the biomedical field in view of the potential dangers of the anticommons or, as an alternative, to consider how the biomedical industries can solve the problem without incurring the certain problems of insufficient property rights in biomedical innovation. In that regard, the rapid growth of new kinds of firms does caution against overconfidence that the anticommons problem can be surmounted. The computer hardware industry had few problems with its cross-licensing arrangements until new kinds of semiconductor firms and foreign consumer products firms arose that, at least initially, preferred exclusivity over freedom to market; but even those problems have been largely surmounted because the joint economic surplus to be shared between differently situated firms has been a sufficient incentive to make the requisite licensing negotiations succeed. Still, it is worth noting that while software patents have been successfully cross-licensed, such cross-licensing arrangements do not extend systematically to the software industry as a whole, despite the fact that some new programs may also potentially infringe many diversely held patents. Perhaps software patent licensing cross-licensing will become the rule in the industry; it is easy to forget that the software industry as we know it is not all that much older than the biotech industry. Of course, if all else fails and the anticommons becomes a serious problem in practice, there is still the remedy of compulsory licensing available. However, the well-known problems involved in compulsory licensing schemes having to do with valuation of inventions and with the likelihood of

[18] IBM alone generates more than $1 billion annually in patent royalties, a major portion of which comes from side payments to IBM as a firm with an especially strong patent portfolio. For a description of the cross-licensing process, see Peter C. Grindley and David J. Teece, Managing Intellectual Capital, 39 California Management Rev. 8 (Winter 1997). The computer hardware industry is an example of what has been called “cumulative systems technologies” where end products frequently potentially infringe many patents in the hands of a number of different firms. Robert Merges and Richard R. Nelson, On the Complex Economics of Patent Scope, 90 Columbia L. Rev. 839, 884-897 (1990); Richard A. Nelson, Benefits and Costs of Strong Statutory Protection: A Contribution to the Current Debate, 27 Research Policy 273, 280-281 (1998).

burdensome legal and administrative expenses make compulsory licensing very much a second-best solution.[19]

III.

Even if we avoid the anticommons trap in the commercial world, we may still not have safeguarded the needs of the academic enterprise for rapid access to, and sharing of, research results and data. The basic problem here is not the patent system but the fact that the Bayh-Dole legislation and the dual basic and applied nature of so much biotech investigation has rendered the modern research university itself uncertain of what it prefers. Fortunately for the future of such universities, most of them have gone far to make sure that the desire to file patent applications does not materially slow down their own scholars' publishing of new research results. Indeed, U.S. patent law, in contrast to most foreign systems, accommodates academic scientific publication by providing a one-year grace period so that the inventor has up to one year after publication to file a patent application.[20]

So far as academic access to valuable research results of commercial firms is concerned, a possible partial solution would be to enact U.S. legislation leading to publication of patent applications prior to issuance of the patent—namely, eighteen months after filing. This is legislation to which the U.S. is internationally committed and which most other countries already have on their books. Indeed, since most U.S. firms in biotech and pharmaceutical research seek patents in other major countries, they are driven under the first-to-file system used in other countries to file just as soon as possible and then to publish their applications after eighteen months. However, nothing in current law, here in the United States or elsewhere, can make a company disclose its research data beyond

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[19] See Merges on Contracting *supra* at 1307ff.

[20] See Robert P. Merges, Patent Law and Policy 225-226 (2d ed. 1997). A related issue is whether the lure of private profit diverts university scientists from their role in adding to scientific knowledge. It is reassuring that in the biotech area recent research shows that "scientists who are more involved in commercialization and patenting are more productive scientifically during their period of involvement." Lynne G. Zucker and Michael R. Darby, Entrepreneurs, Star Scientists, and Biotechnology, NBER Reporter 7 (Fall 1998).

the minimum that patent law requires, but the motivation to keep that data secret is a byproduct of the commercial realities, not the patent law as such or the policies of the U.S. Patent Office.[21]

IV.

The other current intellectual property controversy that agitates the academic research community today concerns database protection. Here the same framework (involving information, incentive and access) used above for patent issues throws light on the underlying conflicting goals and values. Surely there can be no doubt that what is proposed to be protected in the case of databases is pure *information.* Information, albeit in an assembled and convenient form, is in fact the product itself. That drives us to consider the public goods aspect of the issue, and in particular to the issue of the extent to which property rights should be developed to give an *incentive* to develop new databases and to improve existing databases. And that in turn raises the issue of the degree of *access* the law should mandate, particularly for those engaged in basic research.

One of the reasons that the information-incentive-access framework is promising is that the heat in the United States over the database issue has sometimes obscured the issues. My impression is that most informed critics recognize that incentives for the creation of databases are important objectives, not least in science and technology.[22] And although some critics have argued that only

[21] Still another issue is the cost to academic researchers of the patenting of "research tools" in terms of having to pay commercial firms for patented biological materials previously obtained essentially free from other academics. Naturally no one likes to pay more than necessary, especially in underfunded academic laboratories. However, one specific issue that may raise broader policy issues has to do with the terms of licenses to use patented research tools. One example is the reach-through license, in which the patentee reserves the rights to inventions made by the licensee utilizing the patented research tool. See National Research Council, Intellectual Property Rights and Research Tools in Molecular Biology 17 (1997).

[22] See, e.g., J. H. Reichman and Pamela Samuelson, Intellectual Property Rights in Data?, 50 Vanderbilt L. Rev. 51, 137-139, 145-155 (1997). And see Patent and Trademark Office, Report on and Recommendations from April 1998 Conference on Database Protection and Access Issues 26-30 (July 1998) (hereafter "PTO Database Report").

copyrighted databases deserve protection, it is also true that many intellectual property scholars are not entirely satisfied that the *Feist* case involving the protection of telephone books sets the right standard.[23] After all, if pharmaceutical companies are dependent on patent law protection not just for the initial innovation but also to make possible the massive further expenditures for such things as clinical trials that are necessary for the ultimate consumer to enjoy an actual benefit, it may also be true that "sweat-of-the-brow" expenditures can in economic terms justify some protection for what are uncopyrightable databases under *Feist*.

In fact, most critics of database protection are prepared to concede that some carefully limited protection against out-and-out piracy of databases is desirable, even though they may be uncopyrightable under *Feist*. The issues are more ones of detail. For example, are the time limits for protection correctly drawn in view of the fact that by regularly updating a database the database owner may as a practical matter bypass the 15 year time limit and thereby enjoy *de facto* perpetual protection even for those portions of the database that are older than the time-limit period?[24]

It is my impression that academic researchers are not so worried about access as such as they are about databases becoming too expensive for their budgets. Although some such objections from academia are self-serving in view of the readiness with which academic institutions buy books, microscopes, and all the other accoutrements of research, a National Research Council panel found that in most fields of academic research there is only a single relevant database (unlike some commercial databases such as stock quotation services where competition is abundant).[25] Thus, the fear is one of monopoly pricing. Although it might be argued that monopoly pricing should be a question for the antitrust authorities, not for intellectual property policy, the principle is well-established that the antitrust laws do not prohibit an intellectual property owner from pricing in such a way as to maximize income (at least so long as there is no price discrimination between classes of purchasers). That is

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[23] Feist Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340 (1991).
[24] See J. H. Reichman and Pamela Samuelson, *supra* at 85.
[25] National Research Council, Bits of Power (1997).

what is meant in the patent context by the popular if not entirely accurate phrase that a patent is a legal monopoly.

The likelihood of full monopoly pricing is easily exaggerated. Just because there may be only one database in a particular scientific field, it does not follow that full monopoly prices can be charged. To attempt to do so could easily invite entry. Even with strong intellectual property protection against wholesale copying of databases and with a demand structure that can support but one database, the right to be that one database provider is contestable. The resulting threat of entry is likely to constrain pricing to less than the full monopoly price, at least where the underlying data is publicly available for assembly.[26] To deny protection where the market can support only one database would reduce the frequency with which such niche markets are served at all by databases.

In any event, it is generally agreed in the patent area that to deny a patentee freedom of pricing would undercut the entire public goods rationale for patent protection. Thus, one is driven squarely back to whether legal protection for databases is justified by the public goods rationale and the consequent need for an incentive. If so, the monopoly pricing argument is a red herring. To be sure, in this digital world in which data is exploding, particularly in the world of science and technology, access to databases may become a heavy load for universities and their government agency funders to bear. Laura Tyson, former Chairman of the Council of Economic Advisors, observing that information is not cost-free, argues that if academic researchers find databases too expensive for their budgets, the remedy is for government to put more money into research, not to seek what is in effect a subsidy from the database provider, especially if the ultimate question is “protected databases or no databases.”[27] A written report signed by Tyson makes the obvious

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[26] See for a comparable argument in a non-database context, Douglas Gary Lichtman, The Economics of Innovation: Protecting Unpatentable Goods, 81 Minn. L. Rev. 693 (1997). The number of truly sole source databases is a controversial issue. The Patent Office quite properly points out that one should distinguish the situation where the underlying data is uniquely and exclusively held by one party from the situation where the data remains available for collection by others. See PTO Database Report at 24-26.

[27] Linda R. Raber, Database Protection, Chemical and Engineering News 27, 28 (Nov. 17, 1997) .

point that preferential pricing for academic uses would in principle be less efficient than a direct subsidy from the government and that it could be expected that free use of database information by academic users would "adversely affect the growth of information over time to both their own detriment and to the detriment of paying users."[28] On this point the National Research Council panel report reflects the natural position of academic scientists facing a sudden increase in the cost of an important research tool without any prospect of additional compensatory government funding: "Despite a general consensus on the need for sustained levels of investment in research and development, the proposed database laws could change the status quo—without anyone's wanting it to happen—by elevating the price of the one raw material to which U.S. researchers have always had ready access."[29]

From the standpoint of legal policy, as opposed to science policy, the issue can be conceptualized as one of fair use. Many legal critics of database protection are scandalized by the fact that although *Feist*-type uncopyrightable databases by definition involve less creative input than copyrightable works, the latter are available free-of-charge in limited circumstances to academic users under the statutory principle of fair use; but there is no comparable fair use provision in either the EU directive or the original U.S. administration proposals.[30] Since the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes is one of the four statutory criteria in

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[28] Laura D'Andrea Tyson and Edward F. Sherry, Statutory Protection for Databases: Economic and Public Policy Issues 26, 27 (Sept. 5, 1997) (prepared by the Law and Economics Consulting Group for two international publishing companies).

[29] National Research Council, Bits of Power 9 (1997).

[30] The EU Directive does contain an exception for "extraction for the purpose of illustration for teaching and academic research," but the term "illustration" hardly meets the needs of the scientific research user. The U.S. Administration did, however, send a letter to the Congress in August 1998 stating: "Any database misappropriation regime should provide exceptions analogous to 'fair use' principles of copyright law; in particular. any effects on non-commercial research should be *de minimis.*" Letter of Andrew J. Pincus, Department of Commerce, to Senator Orrin G. Hatch (August 4, 1998) (hereafter "Administration Letter"). See also PTO Database Report, *supra*, 16-21.

determining whether academic use infringes a copyright, it is ironic that no such defense would be available for databases not sufficiently creative to be worthy of copyright. Moreover, since the effect of the use upon the potential market for or value of the copyrighted work is a second of the four statutory criteria, academic use for a single research project would arguably be fair use, although it has to be recognized that some database publishers find the academic market their principal market.[31]

Use for academic research is not piracy, the suppression of which is supposedly the central purpose of the database bill, because the legitimate academic researcher does not reoffer the contents of the database in competition with the original provider. And those research institutions that seek to add value to the existing database by adding data and substantially improving the original database would, in a copyright context, have a defense that their use was "transformative" and hence "fair use," constituting new innovation built on a first-generation product. The failure of the database bill to provide a comparable defense was singled out by the Federal Trade Commission as a threat to continuing innovation.[32]

The database bill, which had passed the House of Representatives, was stripped out of the Digital Millennium Copyright Act in conference in the waning days of the last Congressional Session in October. It seems likely, however, that the battle is not over, at least so long as the European Union retains the reciprocity provision in its Database Directive. This reciprocity provision would deny protection within the EU to U.S. database

[31] Some versions of the database bill did contain an exception approximating this latter fair use criterion. The House of Representatives did pass a database bill in 1998, not subsequently enacted, that permitted "extracting or using information for nonprofit education, scientific, or research purposes" as long as such activity "does not harm the actual or potential market" for a database. This provision would not afford fair use academic scientific access to databases marketed to the academic scientific community. See PTO Database Report, *supra*, at 24. Moreover, extraction of an "insubstantial part" of a database was permitted, but this ambiguous provision, even with the additional exception for uses not harming the actual or potential market for the product, fell short of the fair use provisions of the copyright statute.

[32] Letter from Robert Pitofsky, Chairman, Federal Trade Commission, to Congressman Bliely (Sept. 28, 1998).

developers so long as the United States does not provide comparable protection. Since the House version provided for database protection and since Senator Hatch, chairman of the Senate Judiciary Committee, promised to introduce database protection legislation in the next Session as one of the highest priorities of his committee, we can expect the database controversy to be revisited in the coming year. However, Senator Hatch has stated that his approach takes account of the fear that recognizing a property right in databases would hamper scientific research.[33]

Even if one comes out on the side of protection for uncopyrightable databases, a difficult question is to what extent database protection should be available where the underlying data comes from governmental sources. After all, when the public has paid for the generation of the individual data items, then we should expect that they will be made available to the public in least-cost, most convenient form. In effect, however, some government agencies are privatizing the publication of research results they pay for. This issue bears a striking resemblance to the Stevenson-Wydler Act (passed in the same year as Bayh-Dole) which calls on government research agencies to make their intellectual property available through patent licensing for the benefit of the public and the economy. Privatization of the distribution of governmentally generated data is likely to make it more readily available, but who is to bear the cost?[34] And does it make a difference that privatization would be ineffective without giving the private database company exclusive rights (just Stevenson-Wydler assumes that government agencies must be able to grant exclusive patent licenses in order to promote commercialization)?

Here, as in the case of ESTs, I suspect that the current debate over database protection, yes or no, is not as fundamental as some of the related issues. In the October Congressional showdown over database protection and as part of passing legislation implementing two copyright treaties, the Congress accorded protection against

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[33] Statement by Senator Hatch in submitting the report of the conference committee on the Digital Millennium Copyright Act (Oct. 8, 1998).

[34] The Administration has taken the position that "databases generated with Government funding generally should not be placed under exclusive control, *de jure* or *de facto*, of private parties." Administration Letter, *supra*, p. 1.

circumvention of what they termed "copyright protection and management systems," which can be thought of as one class of self-help systems enabling copyright holders to protect their investment at far less cost and with greater convenience to the legitimate non-free-riding user than the formal copyright system.[35] What was implicit in this Congressional decision was a recognition that intellectual property as such is not so important as preserving and promoting a market system. If copyright owners are able to sell access to their works and the right to copy them over the internet, then the market in online services that we already see would develop more rapidly than if users were able to defeat the encryption and other self-help controls essential to such online marketing.

To that end the Digital Millennium Copyright Act contains a provision prohibiting the circumvention of any "technological measure that effectively controls access" to a copyrighted work as well as the manufacture, importation or offer to the public of any technology primarily produced for the purpose of such circumvention. But since such measures may also make it impossible for users to exercise their fair-use rights, the statute seeks to balance provider and user rights through a system in which the Librarian of Congress in a rule-making proceeding may authorize exceptions to that prohibition for users of classes of works that "are adversely affected by virtue of such prohibition in their ability to making noninfringing uses of that particular class of works."[36] Since educational institutions, especially libraries, felt especially at risk, they brought their concerns forcefully to the attention of the Congress and received a special but narrowly qualified exemption concerning circumvention for the purpose of determining whether to acquire a work.[37] Clearly this exemption does not address needs of scientific researchers to override self-help systems in order to exercise fair use rights in the online environment. In the rule-making proceeding, the Librarian of Congress is to take into account the

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[35] On the nature of these systems, and their policy pros and cons, see Kenneth W. Dam, Self-Help in the Digital Jungle, University of Chicago Law and Economics Working Paper No. 59 (1998).

[36] Digital Millennium Copyright Act (1998), 17 U.S.C. §1201.

[37] 17 U.S.C. §1201(d).

impact of the circumvention prohibition on “teaching, scholarship or research.”[38]

To a large extent this rule-making provision simply defers to the future the debate over self-help in the online environment, at least so far as educational and scientific research is concerned. In any case, the new statute applies only to copyrighted works and leaves open the role of self-help systems in any future legislation on uncopyrightable databases that may emerge in the future. Further legislative confrontation on database protection issues thus appears inevitable.

[38] The new statutory prohibition, 17 U.S.C. §1201, takes effect two years after the October 1998 enactment. During this two-year period the Library of Congress is to conduct a rule-making proceeding to determine whether users of a copyrighted work are adversely affect by the prohibition “in their ability to make noninfringing uses...of a particular class of copyrighted work....” In the rule-making proceeding the Librarian is to examine “the impact that the prohibition on the circumvention of technological measures applied to copyrighted works has on criticism, comment, news reporting, teaching, scholarship, or research.”

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